EXPERIMENTAL EVIDENCE FOR THE VALIDITY OF THE IPAT ANXIETY SCALE

EUGENE E. LEVITT AND HAROLD PERSKY

Indiana University Medical Center

Institute of Psychiatric Research, Indiana University Medical Center

PROBLEM

The Institute for Personality & Ability Testing (IPAT) Anxiety Scale[3, 4] consists of 40 items, each of which has three possible responses along a most-to-least or true-false continuum. The first 20 items are considered to be covert or indirect indices of anxiety, while the latter 20 items are overt, manifest symptoms. The ratio of the covert to the overt score might be considered as an index of the degree to which individuals of equivalent anxiety level are aware of their anxiety.

Cattell[3] emphasizes that the scale is presumed to measure anxiety as distinct from psychopathology in general. It should, therefore, be sensitive to variations in "normal anxiety", as well as to differences between anxiety levels of normal individuals and psychiatric cases.

The IPAT scale has been used extensively in various research projects at the Indiana University Medical Center during the past year. The purpose of the present paper is to summarize data collected during this period which have bearing on the validity of the scale as a measure of anxiety.

THE EVIDENCE

Norms. IPAT scores for a group of 76 sophomore student nurses yielded a mean of 25.8, SD 9.8. This is contrasted with norms for 427 college women given by Bendig, Sweney and Scheier[2], which were a mean of 29.5, SD 10.3. A t-test comparison of the means is 3.01, significant beyond the 1% level. The student nurses are thus slightly, but significantly, less anxious than the general college women. This finding bears favorably on the construct validity of the IPAT scale, following the hypothesis that anxiety and dependency are negatively correlated. The study of Levitt, Lubin and Zuckerman[7] shows clearly that the student nurse is more dependent, as measured by the Edwards Personal Preference Schedule, than the average college woman.

Student Nurse Selection. At the end of the academic year 1960-61, 13 sophomore student nurses were dropped from the school for unsatisfactory work. This group had a mean IPAT score of 26.77 as compared with 25.62 for 63 girls who continued on into the junior year. The difference is not significant ($t = 0.35$). However, the covert-overt ratio was 1.110 for the drop-outs as compared with 0.867 for the continuers. This difference is significant at the 5% level ($t = 2.01$). Sixty-three percent of the continuers had higher covert scores as compared with only 31% of the drop-outs.

The significance of this finding for the construct validity of the IPAT is not immediately apparent. We might speculate that awareness of anxiety by the drop-out students was sufficiently great to interfere markedly with learning capacity.

Hypnotizability. Eighteen student nurse volunteers were classified as hypnotizable following two attempts to induce hypnosis using tape recorded suggestions, and employing as criteria the elicitation of most phenomena usually listed under a "light state" in standard hypnotic susceptibility scales. On the same basis, 13 volunteers were classified as refractory to hypnosis. The mean IPAT score for the refractory subjects was 31.69, SD 11.83. The mean for the hypnotizable subjects was 21.94, SD 11.22. A t comparison of the difference between means is 2.33, which is significant beyond the 5% level. This finding is in accord with the results of recent investigations[1, 5], and the subsequent view of Weitzenhoffer[9] that in a normal

(i.e., nonpatient population), the better adjusted individuals tend to be more hypnotizable. It is also in keeping with the common inference from clinical observation that a high anxiety level may make an individual refractory to hypnosis, regardless of other considerations.

Measurement of Hypnotically Induced Anxiety. The data reported under this heading are from a study which was designed to determine the efficacy of an ataractic drug as a prophylactic against anxiety. A control group of seven student nurses was contrasted with three experimental groups of six students each, which received 100 mg. of chlorpromazine, 100 mg. of secobarbital, and an inert placebo. The experimental groups were then exposed to hypnotically induced anxiety and a number of measures were recorded which had also been obtained for the control group. Among these were three verbal devices for the assessment of anxiety: Taylor's Manifest Anxiety Scale, the Affect Adjective Check List[10] and the IPAT Scale, and clinical ratings by two psychiatrists. The results are summarized in Table 1.

TABLE 1. THE MEASUREMENT OF HYPNOTICALLY INDUCED ANXIETY

		Means			
Group	N	IPAT	MAS	AACL	Clinical Ratings
Control	7	19.43	12.86	4.43	0.18
Experimental	18	27.72	12.11	15.00	1.90
t		2.23*	0.22	5.55**	5.81**

*5% level **1% level

Data were analyzed by means of a complex analysis of variance in which six sources of variation were accounted for. The *t*-tests in Table 1 are a result of these analyses. They indicate that the AACL, the IPAT, and clinical ratings successfully differentiated the total experimental group from the control group, while the MAS did not. (There were no differences among the three experimental groups on any of the four measures.)

This investigation is regarded as having essentially negative findings with respect to manifest anxiety. That is, neither the ataractic nor the barbiturate, in the doses given, served as a prophylactic agent against the experience of anxiety. This conclusion is based partly on the IPAT and AACL results, and more strongly on the clinical ratings. Thus, we conclude that the IPAT successfully differentiated subjects in hypnotically induced anxiety from those in the normal state, while the MAS, though it had been predictive with a different experimental design[6], did not.

Anxiety and Artifically-Elevated Plasma Hydrocortisone Level. The data reported here are from a study designed to follow up on earlier observations suggesting that an elevated level of hydrocortisone in the plasma does not *cause* a subjective experience of anxiety in the individual, but may make him more *prone* to experience anxiety in the presence of an appropriate stimulus. The association of plasma hydrocortisone with anxiety has previously been verified in a number of studies[cf. 8].

The subjects in this double-blind, cross-over study were 32 medical students, screened by psychiatric interviews so as to exclude cases of borderline emotional adjustment. On one occasion, each subject was infused with a solution of hydrocortisone calculated to raise the plasma level to 100 micrograms percent, which is about three times greater than the level found in the most anxious psychiatric patients. On another occasion, the infusion was a placebo solution of 5% glucose in water. The occasions were varied randomly among the subjects, and neither the experimenters dealing with measurement data nor the subjects knew which sub-

stance was being administered. The second occasion took place about four months after the first. On both occasions, the AACL, the MAS, the IPAT, and the Rorschach were administered to each subject, and GSR measurements were made.

Of 26 objective Rorschach factors, only one, Sum C, differentiated the two occasions. Neither the AACL nor the MAS differentiated the two occasions, though both means in the elevated hydrocortisone condition were higher than in the placebo condition. The GSR data also did not distinguish the two occasions. The mean IPAT score for subjects with elevated hydrocortisone level was 22.56 as opposed to 20.91 after the administration of the placebo infusion. Though the difference is small, it is significant ($t = 2.07$, $p = .05$).

It is possible to regard the predictive performance of the IPAT Scale as a chance phenomenon, in view of the large number of t-tests which were computed. However, the fact that all three of the verbal devices yielded results in the right direction, plus the other evidence which we have aggregated in this paper, suggest that the IPAT finding is not due to chance. Our tentative conclusion is that the IPAT scale is sensitive to a state of readiness to experience anxiety, as distinct from anxiety level itself.

Reliability. The IPAT was administered to 17 females ranging in age from 19 to 37, on two occasions, the second being from two to three weeks after the first. The respective means and standard deviations were: first occasion, 18.88 and 10.72; second occasion, 19.47 and 11.15. The correlation between the two sets of scores was .94.

Criterion Validity. The data presented so far bear on the construct validity of the IPAT Anxiety Scale; they appear to be generally favorable. The criterion validity data which we have accumulated are not so impressive. In the drug study previously cited, IPAT scores were not related to clinical ratings of anxiety, nor to AACL scores. The correlation between IPAT and MAS scores was .55, which was the only significant coefficient found in interrelationships among the IPAT, AACL, MAS, and clinical ratings.

The relationships in the previous paragraph were based on measures obtained during an hypnotically induced anxiety state. IPAT scores were also found to be unrelated to AACL scores in normal subjects in the normal state. The subjects were the 17 females previously mentioned in the section on reliability. The IPAT measure was obtained by averaging the subjects' two scores, and the AACL measure was obtained from an average of from four to six retestings during a single month. These averagings should furnish more stable indices than single measures. The IPAT-AACL correlation was $-.25$, which is not significant.

Summary

A group of student nurses scored significantly lower on the IPAT Anxiety Scale than do college women in general. Student nurses who were dropped from school had significantly higher covert-overt ratios on the IPAT than did those who remained in school. Hypnotizable students scored significantly lower than did refractory students. IPAT scores are significantly elevated in hypnotically induced anxiety, and also differentiated medical students on an occasion when they were infused with hydrocortisone from a placebo occasion. These findings are considered to bear favorably on the construct validity of the IPAT. In an hypnotically induced anxiety state, IPAT scores were unrelated to clinical ratings of anxiety, and to an affect adjective checklist, but did correlate with Manifest Anxiety Scale scores. No correlation with the AACL was found in a small group of females in the normal state. Thus, the criterion validity of the IPAT was not found to be as adequate as its construct validity. A test-retest reliability coefficient was .94 in a small group of females. Overall, the findings reported here are regarded as reflecting favorably on the IPAT scale as a measure of anxiety.

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RELATIONSHIPS OF THE EPPS NEED PROFILE AMONG EIGHT SAMPLES

FRED HEILIZER AND ARNOLD TREHUB

Veterans Administration Hospital, Brockton, Mass. — *Veterans Administration Hospital, Northampton, Mass.*

PROBLEM AND METHOD

This paper presents data collected by Trehub[7] during an investigation of ego disjunction which are related to data presented by Edwards[4] in certain unexpected ways. Trehub utilized five groups of 20 male *Ss* each: college students, adolescents, neurotics, character disorders, and schizophrenics (the last three groups consisting of hospitalized patients). Raw scores on the 15 needs of the Edwards Personal Preference Schedule (EPPS) were available for four of the groups (college students, neurotics, character disorders, and schizophrenics).

TABLE 1. CORRELATIONS OF THE RAW SCORES OF THE 15 NEEDS OF THE EPPS AMONG THE EIGHT SAMPLES

Groups	M-CS	M-Ne	M-CD	M-Sc	MCS	FCS	MGA	FGA
M-CS	(.88)	.52*	.39	.17	.77**	.43	.27	−.06
M-Ne	.52*	(.88)	.58*	.69**	.38	.77**	.59*	.64**
M-CD	.39	.58*	(.94)	.59*	−.14	.05	.88**	.64**
M-Sc	.17	.69**	.59*	(.86)	−.02	.52*	.53*	.75**
MCS	.77**	.38	−.14	−.02	(.88)	.56*	−.07	−.35
FCS	.43	.77**	.05	.52*	.56*	(.88)	.11	.42
MGA	.27	.59*	.88**	.53*	−.07	.11	(.94)	.66**
FGA	−.06	.64**	.64**	.75**	−.35	.42	.66**	(.86)

*Significant at .05 level. **Significant at .01 level.

[1]The following abbreviations are used for the various groups: Edwards' Male and Female College Students (MCS and FCS), and Male and Female General Adults (MGA and FGA), and Trehub's Male College Students (M-CS), Neurotics (M-Ne), Character Disorders (M-CD), and Schizophrenics (M-Sc).